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EXAMINER	
SHEVIN, MARK L	

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1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/549,673	SYSLAK ET AL.	
	Examiner	Art Unit	
	Mark L. Shevin	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16 and 18-21* is/are pending in the application.

4a) Of the above claim(s) *7-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 12-16, and 18-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1-21, filed September 29th, 2008, are currently under examination. Claims 1-6, 12-16, and 18-20 were amended, claim 17 cancelled, and claim 21 is new.

Status of Previous Objections

2. The previous objection to claim 1 has been withdrawn in view of the amendment to claim 1 removing the word "cold" from parentheses to explicitly claim cold rolling.

Claim Rejections - 35 USC § 103

3. **Claims 1-2, 6, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **US '497** (US 6,238,497 B1) in view of **Fukuda** (US 6,261,706).

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

US '497

US '497 is drawn to a method of producing an aluminum alloy fin stock material for use in heat exchangers (Abstract and Col. 2, lines 25-30).

US '497 teaches that iron in the aluminum alloy forms intermetallic particles during casting that are relatively small and contribute to particle strengthening but when these particles are instead present as large particles, it is difficult to roll such a material to very thin fin stock gauges (col. 3, lines 19-30).

An aluminum alloy is first continuous strip cast at a predetermined cooling rate to form a strip with a thickness of from 3 to 30 mm (col. 4, lines 16-25).

The cast strip is then rolled to an intermediate gauge by cold rolling and then annealed (col. 3, lines 30-32). The intermediate gauge strip is then cold rolled to final gauge (col. 3, lines 32-34).

US '497 specifically links the average cooling rate with the size of intermetallic particles produced (col. 4, lines 50-65), but do not teach what constitutes large particles.

Fukuda

Fukuda teaches an aluminum alloy clad material for heat exchangers that exhibits superior strength after brazing and excellent corrosion resistance (Abstract). Fukuda teaches that large Si compounds and Fe compounds with a (electrical) potential higher than the matrix cause preferential corrosion (col. 2, lines 28-34). A sacrificial anode material is clad onto an aluminum strip and possesses a prescribed number of such "large" Si and Fe intermetallic particles where the line for "large" particles is drawn at 1 micron^2 of circle equivalent diameter. (col. 2, lines 54-64) These large particles are present to preferential corrode and thus protect the inner aluminum layer through galvanic protection.

Lastly, Fukuda teaches that Si and Fe compounds are dispersed in the sacrificial anode material matrix by adjusting the casting conditions of the aluminum alloy, in particular the casting temperature and the cooling rate (col. 5, lines 33-39).

Regarding claim 1, it would have been obvious to one of ordinary skill in the aluminum arts, at the time the invention was made, taking the disclosures of US '497 and Fukuda as a whole, to combine US '497 with Fukuda and continuous cast Al strip such that the intermetallic particles have an average size below above 1 micrometer^2.

This is because both US '497 and Fukuda recognized the relationship between the casting rate and formation of intermetallic particles when continuously casting Al strip stock for heat exchanger components. While US '497 taught that large particles should be avoid due to later problems with rolling thin foil, Fukuda then suggest that Fe and Si intermetallic particles with a size of greater than about 1 micrometer^2 preferentially corrode in a sacrificial anode layer. If one then is not using such a sacrificial anode layer then these large particles would plainly create pitting corrosion as suggested by Fukuda and one would be motivated to avoid the formation of such particles by controlling the casting process (particularly cooling rate as taught by both references) as Pitting corrosion is to be assiduously avoided in the core layer, which is what is being manufactured in the case of US '497.

With respect to the amendment to claim 1 specifying cold rolling, US '497 taught cold rolling the strip cast sheet (col. 3, lines 32-34).

Regarding claim 2, US '497 teaches that the sheets are further annealing during cold rolling (col. 3, lines 30-32, col. 5, lines 5 and 27-30).

With respect to the amendments to claim 2, these changes do not affect the scope of the claim as it relates to the instant rejections applied.

Regarding claim 6, US '497 teaches that the Al strip is cold rolled to a final gauge of 60 micron (0.06 mm) (Figure 1 and Abstract).

With respect to the amendments to claim 6, these changes do not affect the scope of the claim as it relates to the instant rejections applied.

Regarding claim 21, US '497 taught that the cooling rate during strip casting should be greater than 10 °C/sec but preferably less than 250 °C/sec which gives a range of cooling rates that overlaps the claims 10^2 - 10^3 (100-1000) °C/sec. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

4. **Claims 3 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **US '497** in view of **Fukuda** as applied to claims 1-2, 6, and 21 above, in further view of **US '006** (US 6,531,006 B2).

The disclosures of US '497 and Fukuda were discussed above, however neither reference taught the intermediate annealing gauge as 0.58 mm.

US '006

US '006, in a very similar Al strip production process, teaches that after continuous casting, the Al strip is cold rolling to an interanneal gauge of 0.5-3.0 mm (col. 2, lines 55-63).

Regarding claim 3, it would have been obvious to one of ordinary skill in the aluminum arts, at the time the invention was made, taking the disclosures of US '497m Fukuda, and US '006 as a whole, to incorporate the inter-annealing gauge of US '006

into the Al strip production process as taught by US '497 in view of Fukuda as US '006 is drawn to the same problem as US '497 in how to produce thin foil Al strip stock for heat exchangers.

With respect to the amendments to claim 3, these changes do not affect the scope of the claim as it relates to the instant rejections applied.

Regarding claim 12, US '497 taught that the alloy is cast to a strip between 3 and 20 mm thick, and then cold rolled to an interanneal gauge while US '006 adds that such an interanneal gauge should be 0.5 - 3 mm (col. 2, lines 54-63). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

With respect to the amendments to claim 12, these changes do not affect the scope of the claim as it relates to the instant rejections applied.

5. **Claims 4 and 5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **US '497** in view of **Fukuda** as applied to claims 1-2, 6, and 21 above, in further view of **Ziegler** (US 3,827,917 A1) and **ASM Handbook** (Heat Treating of Aluminum Alloys -- Annealing, in ASM Handbook (revised Vol. 4) Metals Handbook, (1998).).

The disclosures of US '497 and Fukuda were discussed above, however neither reference teaches heating or cooling rates in relation to the annealing step.

Ziegler

Ziegler is drawn to the production of aluminum strips with controlled Fe intermetallic particle sizes and distribution (Abstract, col. 1, lines 15-20). As with US

'497 and Fukuda, the intermetallic particle sizes are controlled by the initial casting method (col. 1, lines 15-43).

Ziegler teaches an annealing step where the Al strip is heated to 260 – 482 °C (col. 2, lines 55-72) and cooling to room temperature as a rate of 37.8 – 204.4 °C (col. 3, lines 1-8).

ASM Handbook

ASM Handbook, in the section on "Heat Treating of Aluminum Alloys – Annealing", teaches that the heating rate can be critical for aluminum alloys (p. 4, para 1).

Regarding claims 4 and 5, it would have been obvious to one of ordinary skill in the aluminum arts, at the time the invention was made, taking the disclosures of US '497, Fukuda, Ziegler, and ASM Handbook as a whole, to incorporate the cooling rate of Ziegler into the Al production process of US '497 in view of Fukuda and to optimize the heating rate as taught by ASM Handbook.

Ziegler teaches a cooling rate that overlaps the claimed cooling rate and ASM Handbook teaches that the heating rate during annealing as important in grain growth. Put another way, Ziegler and ASM Handbook teach that the heating and cooling rates are art recognized result effective variables. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed heating and cooling rates through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum

or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

One would be motivated to combine Ziegler as it relates to the production of Al stock material with controlled sizes and distribution of Fe intermetallic particles. Similarly, one would be motivated to combine ASM Handbook as it teaches general processing conditions that should be considered and optimized in the annealing of Al stock.

With respect to the annealing temperature of 340°C and the soak time of 3 hours, one of ordinary skill would be motivated in the course of routine optimization to work within the temperature and time ranges disclosed by US '497.

With respect to the amendments to claims 4 and 5, these changes do not affect the scope of the claims as it relates to the instant rejections applied.

6. **Claims 13-16 and 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **US '497** in view of **Fukuda** as applied to claims 1-2, 6, and 21 above, in further view of **US '006 , Ziegler,** and **ASM Handbook**.

The disclosures of US '497 and Fukuda were discussed above however neither reference teaches the heating or cooling rates. Similarly the disclosure of US '006, used to teach the interanneal gauge, was discussed in section 7 above while the disclosures of Ziegler and ASM Handbook, used to teach the cooling and heat rates respectively, were discussed in section 8 above.

Regarding claims 13-16, it would have been obvious to one of ordinary skill in the aluminum arts, at the time the invention was made, taking the disclosures of US '497,

Fukuda, US '006, Ziegler, and ASM Handbook as a whole, to incorporate the interanneal gauge of US '006, the cooling rate of Ziegler, and the teaching regarding the heating rate from ASM Handbook into the Al strip production process of US '497 in view of Fukuda. This is because US '006 is drawn to the same problem as US '497 in how to produce thin foil Al strip stock for heat exchangers, Ziegler is similarly drawn to the production of Al product with controlled size of Fe intermetallic particles, and ASM Handbook teaches general processing conditions that should be considered and optimized in the annealing of Al stock.

With respect to the annealing temperature of 340°C and the soak time of 3 hours, one of ordinary skill would be motivated in the course of routine optimization to work within the temperature and time ranges disclosed by US '497.

With respect to the amendments to claims 13-16, these changes do not affect the scope of the claims as it relates to the instant rejections applied.

Regarding claims 18-20, US '497 teaches that the Al strip is cold rolled to a final gauge of 60 micron (0.06 mm) (Figure 1 and Abstract).

With respect to the amendments to claims 18-20, these changes do not affect the scope of the claims as it relates to the instant rejections applied.

Response to Applicant's Arguments:

7. Applicant's arguments filed September 29th, 2008 have been fully considered but they are not persuasive.

Applicants assert (p. 6, para 11 to p. 7, para 1) that US '497 does not mentioned "a predetermined solidification rate ensuring material microstructure exhibiting primary

particles having average size below 1 micrometer^2" as defined in claim 1 and is instead directed to a much different goal of minimizing particle size to ease rolling.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

US '497 is not so vastly different or non-analogous from the method of the instant claims as it too is drawn to the minimization of particle size by control of casting conditions. US '497 specifically links the average cooling rate with the size of intermetallic particles produced (col. 4, lines 50-65), but do not teach what constitutes large particles.

Applicants assert (p. 7, para 2-4) that the combination of US '497 with Fukoda would product a two-layer clad solution where the non-corrosive layer would possess the properties as described in US '497.

In response, it would have been obvious to one of ordinary skill in the aluminum arts, at the time the invention was made, taking the disclosures of US '497 and Fukuda as a whole, to combine US '497 with Fukuda and continuous cast Al strip such that the intermetallic particles have an average size below above 1 micrometer^2. This is because both US '497 and Fukuda recognized the relationship between the casting rate and formation of intermetallic particles when continuously casting Al strip stock for heat exchanger components. While US '497 taught that large particles should be avoid due

to later problems with rolling thin foil, Fukuda then suggest that Fe and Si intermetallic particles with a size of greater than about 1 micrometer[2] preferentially corrode in a sacrificial anode layer. If one then is not using such a sacrificial anode layer then these large particles would plainly create pitting corrosion as suggested by Fukuda and one would be motivated to avoid the formation of such particles by controlling the casting process (particularly cooling rate as taught by both references) as pitting corrosion is to be assiduously avoided in the core layer, which is what is being manufactured in the case of US '497.

Applicants assert (p. 7, para 5) that neither US '497 nor Fukuda suggest a predetermined cooling rate during solidification of 10^2 to 10^3 °C/sec.

In response, US '497 taught that the cooling rate during strip casting should be greater than 10 °C/sec but preferably less than 250 °C/sec which gives a range of cooling rates that overlaps the claims 10^2 - 10^3 (100-1000) °C/sec. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

-- Claims 1-3, 12-16, and 18-21 are finally rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

January 7th, 2009